

Tyler Grimes + Jake Holcombe

6 of our tests are not working. It's not calculating misses and hits on some of the later tests but all the tests leading up to read1 are correct. We think that this is due to an error in the set class/LRU but after many hours debugging we could not figure out the problem.

TESTING CODE OUTPUT

Cache Simulator Nway Detialed Test

```
020  120  220  320  420  520  620  720  820  920  a20  b20  c20  d20  e20
f20
1020 1120 1220 1320 1420 1520 1620 1720 1820 1920 1a20 1b20
1c20 1d20 1e20 1f20
```

CACHE:

Set: 0

Blocks

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334861733
00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862506
00 00 00 00

0:

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334861733
00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862506
00 00 00 00

1:

PERFORMANCE COUNTER:

Hits: 0

Misses: 0

Accesses: 0

Writebacks: 0

Miss Rate: -nan%

Writeback Rate: -nan%

Set: 1

Blocks

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862784
00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862917
00 00 00 00

0:

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862784
00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862917
00 00 00 00

1:

PERFORMANCE COUNTER:

Hits: 0

Misses: 0

Accesses: 0

Writebacks: 0

Miss Rate: -nan%

Writeback Rate: -nan%

READ 0

0

020 120 220 320 420 520 620 720 820 920 a20 b20 c20 d20 e20
f20

1020 1120 1220 1320 1420 1520 1620 1720 1820 1920 1a20 1b20

1c20 1d20 1e20 1f20

CACHE:

Set: 0

Blocks

Blocks

0:

Valid: 1 Tag: 0 Dirty: 0 Timestamp: 1718317522335364897
00 01 02 03

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862506
00 00 00 00

0:

Blocks

0:

Valid: 1 Tag: 0 Dirty: 0 Timestamp: 1718317522335364897
00 01 02 03

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862506
00 00 00 00

1:

PERFORMANCE COUNTER:

Hits: 0

Misses: 1

Accesses: 1

Writebacks: 0

Miss Rate: 100.00%

Writeback Rate: 0.00%

Set: 1

Blocks

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862784
00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862917
00 00 00 00

0:

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862784
00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862917
00 00 00 00

1:

PERFORMANCE COUNTER:

Hits: 0

Misses: 1

Accesses: 1

Writebacks: 0

Miss Rate: 100.00%

Writeback Rate: 0.00%

READ 2

2

020 120 220 320 420 520 620 720 820 920 a20 b20 c20 d20 e20
f20

1020 1120 1220 1320 1420 1520 1620 1720 1820 1920 1a20 1b20

1c20 1d20 1e20 1f20

CACHE:

Set: 0

Blocks

Blocks

0:

Valid: 1 Tag: 0 Dirty: 0 Timestamp: 1718317522335965017

00 01 02 03

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862506

00 00 00 00

0:

Blocks

0:

Valid: 1 Tag: 0 Dirty: 0 Timestamp: 1718317522335965017

00 01 02 03

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862506

00 00 00 00

1:

PERFORMANCE COUNTER:

Hits: 1

Misses: 1

Accesses: 2

Writebacks: 0

Miss Rate: 50.00%

Writeback Rate: 0.00%

Set: 1

Blocks

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862784

00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862917

00 00 00 00

0:

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862784

00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862917

00 00 00 00

1:

PERFORMANCE COUNTER:

Hits: 1

Misses: 1

Accesses: 2

Writebacks: 0

Miss Rate: 50.00%

Writeback Rate: 0.00%

READ 4

16

020 120 220 320 420 520 620 720 820 920 a20 b20 c20 d20 e20

f20

1020 1120 1220 1320 1420 1520 1620 1720 1820 1920 1a20 1b20

1c20 1d20 1e20 1f20

CACHE:

Set: 0

Blocks

Blocks

0:

Valid: 1 Tag: 0 Dirty: 0 Timestamp: 1718317522335965017

00 01 02 03

1:

Valid: 1 Tag: 1 Dirty: 0 Timestamp: 1718317522336552416

10 11 12 13

0:

Blocks

0:

Valid: 1 Tag: 0 Dirty: 0 Timestamp: 1718317522335965017

00 01 02 03

1:

Valid: 1 Tag: 1 Dirty: 0 Timestamp: 1718317522336552416

10 11 12 13

1:

PERFORMANCE COUNTER:

Hits: 1

Misses: 2

Accesses: 3

Writebacks: 0

Miss Rate: 66.67%

Writeback Rate: 0.00%

Set: 1

Blocks

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862784

00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862917

00 00 00 00

0:

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862784

00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862917

00 00 00 00

1:

PERFORMANCE COUNTER:

Hits: 1

Misses: 2

Accesses: 3

Writebacks: 0

Miss Rate: 66.67%

Writeback Rate: 0.00%

READ 10

0

020 120 220 320 420 520 620 720 820 920 a20 b20 c20 d20 e20

f20

1020 1120 1220 1320 1420 1520 1620 1720 1820 1920 1a20 1b20

1c20 1d20 1e20 1f20

CACHE:

Set: 0

Blocks

Blocks

0:

Valid: 1 Tag: 2 Dirty: 0 Timestamp: 1718317522337152966
00 00 00 00

1:

Valid: 1 Tag: 1 Dirty: 0 Timestamp: 1718317522336552416
10 11 12 13

0:

Blocks

0:

Valid: 1 Tag: 2 Dirty: 0 Timestamp: 1718317522337152966
00 00 00 00

1:

Valid: 1 Tag: 1 Dirty: 0 Timestamp: 1718317522336552416
10 11 12 13

1:

PERFORMANCE COUNTER:

Hits: 1

Misses: 3

Accesses: 4

Writebacks: 0

Miss Rate: 75.00%

Writeback Rate: 0.00%

Set: 1

Blocks

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862784
00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862917
00 00 00 00

0:

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862784
00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862917
00 00 00 00

1:

PERFORMANCE COUNTER:

Hits: 1

Misses: 3

Accesses: 4

Writebacks: 0

Miss Rate: 75.00%

Writeback Rate: 0.00%

READ 12

192

020 120 220 320 420 520 620 720 820 920 a20 b20 c20 d20 e20
f20

1020 1120 1220 1320 1420 1520 1620 1720 1820 1920 1a20 1b20
1c20 1d20 1e20 1f20

CACHE:

Set: 0

Blocks

Blocks

0:

Valid: 1 Tag: 2 Dirty: 0 Timestamp: 1718317522337152966
00 00 00 00

1:

Valid: 1 Tag: 3 Dirty: 0 Timestamp: 1718317522337741680
C0 F2 45 25

0:

Blocks

0:

Valid: 1 Tag: 2 Dirty: 0 Timestamp: 1718317522337152966
00 00 00 00

1:

Valid: 1 Tag: 3 Dirty: 0 Timestamp: 1718317522337741680
C0 F2 45 25

1:

PERFORMANCE COUNTER:

Hits: 1

Misses: 4

Accesses: 5

Writebacks: 0

Miss Rate: 80.00%

Writeback Rate: 0.00%

Set: 1

Blocks

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862784

00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862917

00 00 00 00

0:

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862784

00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862917

00 00 00 00

1:

PERFORMANCE COUNTER:

Hits: 1

Misses: 4

Accesses: 5

Writebacks: 0

Miss Rate: 80.00%

Writeback Rate: 0.00%

READ 1

2

020 120 220 320 420 520 620 720 820 920 a20 b20 c20 d20 e20

f20

1020 1120 1220 1320 1420 1520 1620 1720 1820 1920 1a20 1b20

1c20 1d20 1e20 1f20

CACHE:

Set: 0

Blocks

Blocks

0:

Valid: 1 Tag: 0 Dirty: 0 Timestamp: 1718317522338355266

01 02 03 04

1:

Valid: 1 Tag: 3 Dirty: 0 Timestamp: 1718317522337741680

C0 F2 45 25

0:

Blocks

0:

Valid: 1 Tag: 0 Dirty: 0 Timestamp: 1718317522338355266

01 02 03 04

1:

Valid: 1 Tag: 3 Dirty: 0 Timestamp: 1718317522337741680

C0 F2 45 25

1:

PERFORMANCE COUNTER:

Hits: 1

Misses: 5

Accesses: 6

Writebacks: 0

Miss Rate: 83.33%

Writeback Rate: 0.00%

Set: 1

Blocks

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862784

00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862917

00 00 00 00

0:

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862784

00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862917

00 00 00 00

1:

PERFORMANCE COUNTER:

Hits: 1

Misses: 5

Accesses: 6

Writebacks: 0

Miss Rate: 83.33%

Writeback Rate: 0.00%

READ 16

2

020	120	220	320	420	520	620	720	820	920	a20	b20	c20	d20	e20
f20														
1020	1120	1220	1320	1420	1520	1620	1720	1820	1920	1a20	1b20			
1c20	1d20	1e20	1f20											

CACHE:

Set: 0

Blocks

Blocks

0:

Valid: 1 Tag: 0 Dirty: 0 Timestamp: 1718317522338355266
01 02 03 04

1:

Valid: 1 Tag: 4 Dirty: 0 Timestamp: 1718317522338945247
02 00 00 00

0:

Blocks

0:

Valid: 1 Tag: 0 Dirty: 0 Timestamp: 1718317522338355266
01 02 03 04

1:

Valid: 1 Tag: 4 Dirty: 0 Timestamp: 1718317522338945247
02 00 00 00

1:

PERFORMANCE COUNTER:

Hits: 1

Misses: 6

Accesses: 7

Writebacks: 0

Miss Rate: 85.71%

Writeback Rate: 0.00%

Set: 1

Blocks

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862784
00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862917
00 00 00 00

0:
Blocks

0:
Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862784
00 00 00 00

1:
Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862917
00 00 00 00

1:
PERFORMANCE COUNTER:
Hits: 1
Misses: 6
Accesses: 7
Writebacks: 0
Miss Rate: 85.71%
Writeback Rate: 0.00%

WRITE 6
020 120 220 320 420 520 620 720 820 920 a20 b20 c20 d20 e20
f20
1020 1120 1220 1320 1420 1520 1620 1720 1820 1920 1a20 1b20
1c20 1d20 1e20 1f20

CACHE:
Set: 0
Blocks

Blocks
0:
Valid: 1 Tag: 1 Dirty: 1 Timestamp: 1718317522339529612
00 00 66 00

1:
Valid: 1 Tag: 4 Dirty: 0 Timestamp: 1718317522338945247
02 00 00 00

0:
Blocks
0:
Valid: 1 Tag: 1 Dirty: 1 Timestamp: 1718317522339529612
00 00 66 00

1:
Valid: 1 Tag: 4 Dirty: 0 Timestamp: 1718317522338945247

02 00 00 00

1:

PERFORMANCE COUNTER:

Hits: 1

Misses: 7

Accesses: 8

Writebacks: 0

Miss Rate: 87.50%

Writeback Rate: 0.00%

Set: 1

Blocks

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862784

00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862917

00 00 00 00

0:

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862784

00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862917

00 00 00 00

1:

PERFORMANCE COUNTER:

Hits: 1

Misses: 7

Accesses: 8

Writebacks: 0

Miss Rate: 87.50%

Writeback Rate: 0.00%

WRITE 21

020 120 220 320 420 520 620 720 820 920 a20 b20 c20 d20 e20

f20

1020 1120 1220 1320 1420 1520 1620 1720 1820 1920 1a20 1b20

1c20 1d20 1e20 1f20

CACHE:

Set: 0

Blocks

Blocks

0:

Valid: 1 Tag: 1 Dirty: 1 Timestamp: 1718317522339529612
00 00 66 00

1:

Valid: 1 Tag: 5 Dirty: 1 Timestamp: 1718317522340103037
00 55 00 00

0:

Blocks

0:

Valid: 1 Tag: 1 Dirty: 1 Timestamp: 1718317522339529612
00 00 66 00

1:

Valid: 1 Tag: 5 Dirty: 1 Timestamp: 1718317522340103037
00 55 00 00

1:

PERFORMANCE COUNTER:

Hits: 1

Misses: 8

Accesses: 9

Writebacks: 0

Miss Rate: 88.89%

Writeback Rate: 0.00%

Set: 1

Blocks

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862784
00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862917
00 00 00 00

0:

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862784
00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862917

00 00 00 00

1:

PERFORMANCE COUNTER:

Hits: 1

Misses: 8

Accesses: 9

Writebacks: 0

Miss Rate: 88.89%

Writeback Rate: 0.00%

READ 12

020 120 220 320 420 520 620 720 820 920 a20 b20 c20 d20 e20
f20

020 020 6620 020 1420 1520 1620 1720 1820 1920 1a20 1b20 1c20
1d20 1e20 1f20

CACHE:

Set: 0

Blocks

Blocks

0:

Valid: 1 Tag: 3 Dirty: 0 Timestamp: 1718317522340677076

C0 F2 45 25

1:

Valid: 1 Tag: 5 Dirty: 1 Timestamp: 1718317522340103037

00 55 00 00

0:

Blocks

0:

Valid: 1 Tag: 3 Dirty: 0 Timestamp: 1718317522340677076

C0 F2 45 25

1:

Valid: 1 Tag: 5 Dirty: 1 Timestamp: 1718317522340103037

00 55 00 00

1:

PERFORMANCE COUNTER:

Hits: 1

Misses: 9

Accesses: 10

Writebacks: 1

Miss Rate: 90.00%

Writeback Rate: 10.00%

Set: 1

Blocks

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862784
00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862917
00 00 00 00

0:

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862784
00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862917
00 00 00 00

1:

PERFORMANCE COUNTER:

Hits: 1

Misses: 9

Accesses: 10

Writebacks: 1

Miss Rate: 90.00%

Writeback Rate: 10.00%

WRITE 30

020 120 220 320 420 520 620 720 820 920 a20 b20 c20 d20 e20
f20

020 020 6620 020 1420 1520 1620 1720 1820 1920 1a20 1b20 1c20
1d20 1e20 1f20

CACHE:

Set: 0

Blocks

Blocks

0:

Valid: 1 Tag: 3 Dirty: 0 Timestamp: 1718317522340677076
C0 F2 45 25

1:

Valid: 1 Tag: 7 Dirty: 1 Timestamp: 1718317522341262451
00 00 EE 00

0:

Blocks

0:

Valid: 1 Tag: 3 Dirty: 0 Timestamp: 1718317522340677076
C0 F2 45 25

1:

Valid: 1 Tag: 7 Dirty: 1 Timestamp: 1718317522341262451
00 00 EE 00

1:

PERFORMANCE COUNTER:

Hits: 1

Misses: 10

Accesses: 11

Writebacks: 2

Miss Rate: 90.91%

Writeback Rate: 18.18%

Set: 1

Blocks

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862784
00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862917
00 00 00 00

0:

Blocks

0:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862784
00 00 00 00

1:

Valid: 0 Tag: 0 Dirty: 0 Timestamp: 1718317522334862917
00 00 00 00

1:

PERFORMANCE COUNTER:

Hits: 1

Misses: 10

Accesses: 11

Writebacks: 2

Miss Rate: 90.91%

Writeback Rate: 18.18%

